

DescriptionPlumbing Fixture

The invention relates to a plumbing fixture that has a mixture cartridge situated within a fixture housing. Such plumbing fixtures are usually intended for installation on a flat surface. They have an installation opening, through which installation is effected, on their underside, that is, on that side that, for example, rests on a wash basin and is fastened thereto. Water lines and, in some cases, drain lines as well, are also routed through this opening. In the case of plumbing fixtures for use on sinks, it is known that a sprayer that is supplied with water by a hose that is routed through the fixture is arranged on a spout. This hose is also routed through the installation opening and connected to a pipe coming from the mixer cartridge or a selector valve on a pipe exiting the plumbing fixture, beneath the wash basin or sink.

This connection is usually made using union nuts that connect the hose to the pipe. This is a rather difficult sort of connection to make that is made even more difficult by the fact that the installer must occasionally work under unfavorable conditions.

The problem addressed by the invention is creating a means for simplifying the installation of a plumbing fixture of that sort and reducing the installation costs involved.

In order to solve that problem, the invention proposes a plumbing fixture having those features stated in claim 1. Elaborations of the invention are covered by the subclaims. The invention also proposes employment according to claim 9.

Quick-connect connectors for connecting hoses, as such, are known. They are usually used for rapidly connecting a hose to a hose or connecting a hose to a pipe and subsequently disconnecting them from one another, which is why they are

termed "quick-connect connectors." However, the invention employs these sorts of quick-connect connectors at a location where connections between two lines must be disconnected and reconnected on extremely rare occasions only. The connections involved must be disconnected only when repairs become necessary, which frequently will not occur until years later. However, utilizing a quick-connect connector has the advantage that the installer need not use any tools, such as wrenches and pliers, for which there might be very little space available beneath a sink.

Two lines exiting the installation opening of a plumbing fixture may also be connected in cases involving fixtures other than fixtures for mounting on a sink, for example, cases where a permanent outlet from the fixture housing is also to be supplied with water via a hose. Such cases might also arise where one would rather not incorporate water conduits into the fixture housing due to lack of space therein or the need to keep the fixture's weight within bounds.

In rare instances, the two lines might also be associated with two separate housings that are functionally combined, rather than a single plumbing fixture. For example, the spout might have a housing of its own that is arranged at a certain distance from the housing accommodating the selector valve. The invention may be beneficially employed in this case as well, since there might also be instances where a somewhat longer stretch must be bridged using a hose. Here as well, the invention will yield benefits in terms of simpler, more rapid installation and assembly.

In particular, under an elaboration on the invention, it may be provided that the quick-connect connector is configured in the form of a plug-in connector, which will allow connecting the ends of two lines using the connector, and thus connecting them to one another, using a simple insertion procedure.

Of course, the quick-connect connector may also be configured in the form of a single-ended plug-in connector, since it might well be that one end of the quick-

connect connector has already been connected to an end of one of the lines prior to installation. However, since, in the case of a repair, it cannot be predicted where the connection should be disconnected, the invention proposes the opportunity that has just been mentioned for designing the quick-connect connector such that both of its ends are configured in the form of plug-in connectors. In particular, in that case, it is provided that the quick-connect connector is configured such that both of its ends are identical in order that it will not matter how the installer attaches the plug-in connector.

Under an elaboration on the invention, it may be provided that the ends of both lines are provided with a fitting that may be brought into engagement with, and latched in place in, the plug-in connector. If desired, the quick-connect connector may also have insertion aids in order that the installer may also make connections under circumstances, under which the quick-connect connector is out of the field of view.

In the event that maintenance proves necessary, that is, need for being able to disconnect the lines from the quick-connect connector arises, the invention provides that the quick-connect connector and/or the ends of the lines may be more elaborately configured such that disconnection may be effected without use of tools. Under some circumstances, they may also be configured such that the connection will be permanently disrupted thereby, since the component involved may be a very simple and inexpensive item.

Under a further elaboration on the invention, it may be provided that the motion that is required for latching the fittings in place and yields their detenting is effected by deformations of parts of the connector, i.e., is effected by parts thereof, other than distinct components that may be independently displaced relative to the connector.

The fittings may, for example, be soldered into the respective ends of the lines if the ends of the lines are metallic, or may be adhesively bonded therein, depending

upon the material from which they, and their associated line, are fabricated, which will be feasible either in the case of metallic pipes or hoses that are fabricated from a deformable material.

In the simplest case, the line exiting the fixture may be a rigid pipe, while the line leading into the fixture may be a hose. However, the invention will also be applicable in cases where the both lines are hoses.

In this latter case, it will be particularly beneficial and cost-effective if identical fittings may be employed on the ends of both lines.

Other features, details, and benefits of the invention will be evident from the claims and the abstract, the wordings of both of which are herewith made part of this description by way of reference thereto, from the following description of a preferred embodiment of the invention, and from the figures, where all features thereof described may represent either themselves alone or arbitrary combinations thereof that may be regarded as essential to the invention. The figures depict:

Fig. 1 a schematic, partially sectioned, side view of a plumbing fixture;

Fig. 2 a side view of a quick-connect connector, into which two fittings have been inserted;

Fig. 3 a top/bottom view of part of the assembly shown in Fig. 2;

Fig. 4 a side view of a fitting that may be used for connecting a line to a quick-connect connector;

Fig. 5 a perspective view of a simplified embodiment of a plug-in connector.

Fig. 1 depicts a greatly simplified representation of a plumbing fixture having a housing 1 that has an essentially cylindrical shape and a spout 2 formed on one of

its sides, namely, its front side. A sprayer, which has not been shown in Fig. 1, that may be detached from, and withdrawn from, the spout 2 is installed in the spout. The sprayer is connected to a hose 3 that is routed through the housing 1 of the plumbing fixture, through an installation opening, which is out of view in Fig. 1, and through a threaded extension 4. This threaded extension 4 is a pipe section 5 that has a thread on its outer surface that is screwed into the installation opening in the housing 1 of the plumbing fixture and used to bolt the housing 1 of the plumbing fixture onto a plate 6. A nut 7 that is screwed thereon from beneath the plate 6 bolts it thereto.

The housing 1 of the plumbing fixture also incorporates a mixer cartridge that supplies the sprayer with water at a temperature that is obtained by mixing hot and cold water. The outlet from the mixer cartridge is routed through a rigid pipe 8, where this pipe 8 is also routed through the shaft 4 of the fixture. This pipe 8 terminates below the extension 4.

Not shown in Fig. 1 is that both the rigid pipe 8 and the hose 3 terminate below the extension 4, are provided with fittings on their terminations there, and must be interconnected there. Water exiting the mixer cartridge enters the pipe 8, from whence it must necessarily enter the hose 3. Their connection employs a plug-in connector that is shown in Fig. 2. The plug-in connector involved is a monolithic, injection-molded, plastic part, whose ends are both identically shaped. This plug-in connector 9 thus has a center section adjoined by the pair of jack sections 10. A fitting 11 that incorporates an extension 12, onto which a hose may be inserted, or that may be inserted into a pipe, is inserted into each jack section 10. As may be seen by comparing Figs. 2 and 3, the jack sections 10 have lands extending over part of their lengths in order to allow distorting their circular cross-sections in order to disengage the jack sections 10 from the fittings by squeezing certain parts thereof, for example, 13 in Fig. 3. Quick-connect connectors of this type are known, and require no further explanation.

Fig. 4 depicts such a fitting that may be used on the quick-connect connector shown in Figs. 2 and 3. The fitting 11 incorporates a washer section 14, from which the extension 12 for attaching the hose or line protrudes, while that part thereof that engages the connector is formed on its other end. A tip 15 that is bounded at its rearward end by a shoulder 16 extends a considerable distance into the connector. This shoulder 16 engages the jack section 10 in order to generate a detenting and latching effect. One indication of how that latching might look is shown in Fig. 5, which depicts a simplified plug-in connector 19. A pair of barbed hooks 20 for gripping the far side of the shoulder 16 or far side of the washer section 14 that flex radially outward when the fitting is inserted into the connector due to the presence of a tapered surface 21, and subsequently grip the far side of a suitable protrusion or shoulder, are present. O-rings or other types of sealing rings that may be arranged on the extension 15 or between the shoulder 16 and the washer section 14 may be used for sealing. The fitting may also have a different shape.

Such a fitting, for example, a fitting like that shown in Fig. 4, is soldered into the end of the line 8 from the mixer cartridge. This fitting might be a simple lathe-turned metal part. However, it might also be fabricated from plastic and be adhesively bonded into the pipe 8.

Such a fitting is also inserted into, for example, pressed into, the end of the hose 3 leading to the hand-held sprayer, and may also be adhesively bonded thereto. The fittings protrude only slightly beyond the outer walls of their associated lines in the radial direction and thus will not prevent, for example, insertion of the hose 3 into the interior of the tubular extension 4.

The two fittings may thus be connected to one another simply by plugging them into the quick-connect connector shown in Figs. 2, 3, and 5, without need for using any tools. The installer will also be able to perform this task with one hand. The invention creates simple means for connecting lines situated at difficult to access locations with little expenditure of effort.